

We Claim:

1. A module forming a heat sink for semiconductor components, comprising:

a flat-surfaced substrate formed of a diamond composite material containing from 40 to 90% by volume of diamond;

a multilayer, metallic coating applied to said substrate, said coating having a first layer containing a carbide-forming metal, and at least in part of the substrate surface at least one second layer predominantly comprising at least one metal selected from the group consisting of Cu, Ni, Ag, and Au; and

a ceramic housing frame areally joined to edge zones of said substrate, and soldered onto said substrate having been provided at least with said first layer.

2. The module according to claim 1, wherein said first layer, containing carbide-forming metal, has a thickness of $< 2 \mu\text{m}$.

3. The module according to claim 1 formed with a surface having regions configured for a semiconductor chip to be areally soldered to.

4. The module according to claim 1, wherein said diamond composite substrate contains at least one component selected from the group SiC, Ag, Au, Al and Cu.
5. The module according to claim 1, wherein said first layer contains at least one metal selected from the group consisting of Ti, Zr, Hf, V, Nb, and Ta.
6. The module according to claim 1, wherein said diamond/composite substrate with said coating has a thermal conductivity, perpendicular to said coating layers, of > 300 W/(mK).
7. The module according to claim 1, wherein said coating is formed with a layer sequence Ti, Ni, Au.
8. The module according to claim 1, wherein said first layer is applied as a solder layer.
9. The module according to claim 1, wherein said first layer is a vapor-deposited layer.
10. The module according to claim 1, wherein said ceramic housing frame is made of AlN.